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A SCIENTIFIC-TECHNICAL CONFERENCE ON SECONDARY NON-FERROUS  
METALS

by L. Miller

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## FOREWORD

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## A SCIENTIFIC-TECHNICAL CONFERENCE ON SECONDARY NON-FERROUS METALS

[Following is the translation of an article by L. Miller in Tsvetnyye Metally, (Non-Ferrous Metals), No. 5, Moscow, May 1961, pages 77-79.]

A scientific-technical conference of workers in secondary non-ferrous metallurgy took place 25-27 January 1961 in the city of Khar'kov. It was organized on the initiative of the Scientific-Technical Society of Non-Ferrous Metallurgy.

Plant and administrative representatives from "Vtormet" [Vtorichnyye Metally--Secondary Metals], representatives from scientific research institutes, sovnarkhozes, the Gosplan USSR, the State Economic Council USSR, the State Scientific Technical Committee USSR and from the All-Union Sovnarkhoz all took part in that conference. There was a total of 143 delegates.

The following reports were heard and discussed: "On Methods of Developing Secondary Non-Ferrous Metallurgy" (G. T. Grif); "Regarding an Improvement in the Preparation and Reprocessing of Scrap and of the By-Products of Non-Ferrous Metals" (S. M. Eydis); "Perfection of the Techniques for Producing Secondary Copper Base Alloys" (S. I. Guz'); "The Basic Trends in Raising the Quality of Secondary Aluminum Base Alloys" (L. V. Yafayev); "Electric Smelting of Secondary Aluminum Alloys in Induction Furnaces" (I. V. Baksht); "The Use of Vacuum in the Metallurgy of Secondary Non-Ferrous Metals" (P. S. Shesternin); "A Rise in the Productivity of Labor in the Production of Secondary Non-Ferrous Metals" (A. Yu. Senyavin); "Flux for the Smelting of Secondary Aluminum" (N. I. Grafas); "The Mechanization and Automation of the Production of Secondary Nonferrous Metals" (A. A. Voskresenskaya); "The Reprocessing of Saline Slag from the Smelting of Secondary Aluminum Alloys" (A. Ya. Fisher); as well as other reports.

Twenty-six persons took part in the discussions following the reports.

The speeches and decisions of the conference all pointed out that the workers of the industry of secondary metallurgy along with the entire Soviet people received the resolution of the January Plenum of the Central Committee CPSU regarding the convocation of the regular 22nd Congress of the CPSU with enthusiasm and resolved to develop a widescale socialist competition for the fulfillment of production

plans ahead of schedule, and to achieve maximum mobilization of all the resources of non-ferrous metals available in the country.

The raw material resources of secondary non-ferrous metals are steadily increasing. The production of secondary metals increased 3.2 times over a period of twenty years, and over the past five years it increased 1.4 times. The output of scrap and aluminum by-products increased several times in 1960 by comparison with 1950.

Work accomplished for the improvement of the quality of scrap and of the by-products of copper and copper base alloys led to an increase in the supply of scrap to the rolling mills. In 1957, 14.8% of the resources of secondary copper and its alloys were directed into the production of rolled metal, and in 1960--19%.

During the past few years organizations of the "Vtormet" conducted measures designed to concentrate the primary processing of scrap primarily in workshops having the proper equipment and skilled personnel. New dressing-sorting workshops were placed in operation at enterprises located in the cities of Moscow, Kuybyshev, Kazan', Leningrad and elsewhere. The technical equipment of the enterprises for the primary processing of scrap with fagotting presses, magnetic separators, and crocodile shears showed a marked improvement. Mechanical dressing of cable scrap was put into production, and styloscopes are used for sorting scrap.

An improvement in the production of raw materials, a perfection of the technological processes, the implementation of refining and of methods for rapid analysis permitted an improvement in the quality of the output and a decrease in the volume of harmful impurities.

The plants of secondary non-ferrous metallurgy assimilated new, perfected technological processes: electric smelting of lead and cupriferous by-products at the mines; the smelting of aluminum by-products in electric induction furnaces with crucibles out of heat resistant concrete and packed refractory materials; the casting of bronze products by means of vacuum suction and so on.

The productivity of the various sections increased and the indices reflecting the volume of extracted metal improved. The diurnal output per square meter of furnace floor in aluminum production increased from 3.1 tons in 1955 to 3.6 tons in 1960, and that of copper base alloys from 9.8 tons to 12.4 tons for the same period of time. The productivity of the vacuum distillation furnaces increased more than twofold.

The conference pointed out some existing serious deficiencies along with the achievements in the production of secondary raw material and the production of secondary non-ferrous metals. Up until the present time a large amount of secondary raw material, especially brass and aluminum alloys, is continually supplied in a mixed and impure form. Work designed to raise the quality of secondary raw material is complicated by the fact that the existing standard for scrap and the by-products of non-ferrous metals is outdated and requires a re-examination.

Research work for finding new alloys from the secondary non-ferrous metals is not adequate, and new plants and workshops for the processing of scrap are designed very slowly. Insufficient attention is devoted to the organization of research and experimental work in laboratories and workshops at some of the plants of secondary non-ferrous metals.

In addition to that at the present time there is a considerable discrepancy between the raw material resources of secondary aluminum and the existing capacities for processing them, while the construction of new plants and workshops is being conducted too slowly.

Guiding themselves by the resolutions of the 21st Congress CPSU and those of the subsequent Plenums of the Central Committee CPSU, the scientific-technical conference of workers of secondary non-ferrous metallurgy considers the following to be the most important tasks confronting the industry of secondary non-ferrous metallurgy: a further increase in the production of secondary non-ferrous metals; an improvement in the quality of the gathered raw material and of the alloy products, assuring their widespread application in machine building; a comprehensive utilization of secondary raw material; a further improvement in the productivity of labor by implementing progressive technological processes, mechanization and automation.

In order to fulfill these tasks the conference considers the following to be necessary:

#### In the Production of Aluminum Base Alloys.

To approve the initiative manifested by the collective of the Khar'kov aluminum and bronze alloys, which assumed an obligation to produce thousands of tons more of secondary aluminum during 1961 using its available production capacities. To suggest to other plants of secondary metallurgy that they utilize their potentials for increasing the output of secondary metals and alloys through the utilization of internal reserves and decrease the production of metal types having a limited application.

To accelerate the installation of vacuum distillation furnaces for the refining of aluminum alloys (removal of zinc). At one of the workshops to stipulate not just the removal of zinc, but the complete refining by the magnesium method. Between 1962-1963 to organize at all plants the refining of alloy casts from gases and nonmetallic admixtures by filtration, vacuum degassing or processing with flux.

In order to decrease spoilage and the volume of oxides and gases to organize a siphon or vacuum pouring of metal during 1961-1962, at those plants where the pouring machines are at a distance from the furnaces.

To conduct an industrial test of induction furnaces of the IA-5 type at the Moscow aluminum alloy plant in order to assimilate the technology of smelting.

At the Mtsenskiy secondary non-ferrous metals plant, which is under construction, to stipulate the building of a furnace with a

removable chamber and a shaft furnace during 1962; for the plant to conduct the necessary tests in collaboration with the "Giprotsvetmetobrabotka" [Gosudarstvennyy Nauchno-Issledovatel'skiy i Proyektnyy Institut Obrabotki Tsvetnykh Metallov--State Design and Planning Scientific Research Institute for Working of Nonferrous Metals] Institute in order to assimilate them on an industrial scale.

To recommend the utilization of heat resistant concrete on a wider scale as refractory material at all the plants for the repair of furnaces, dampers and for the lining of ladles, and for the Moscow aluminum alloy plant, along with the "Giprotsvetmetobrabotka" Institute, to continue its work in the utilization of heat resistant concrete and packed masses for induction furnace crucibles.

In order to eliminate losses of metal due to oxidation, to make a recommendation to plants having a considerable volume of aluminum slag and filings, to process them on a priority basis.

To push rapidly for the building of the Mtsenskiy secondary non-ferrous metals plant and of the new workshops for the processing of secondary aluminum at the Sukhlozhskiy and Khar'kovskiy plants. To organize the production of profiled aluminum alloys for the machinebuilding industry.

#### In the Production of Copper Base Alloys.

To organize the manufacture of semi-finished products (ingots and bushings) between 1961 and 1963, at all plants producing copper base alloys. For the Khar'kovskiy plant in collaboration with the Ukrainian Institute of Metals to complete research work in the continuous casting of bronze ingots and bushings on the horizontal type assembly in 1961, as well as to conduct experiments in casting them by using other progressive means; to report on the results of such experiments to all interested plants.

In the production of bronze and brass at all plants (except for the Moscow bronze-brass plant) to convert from reverberating furnaces to electrical induction furnaces between 1961 and 1965.

To suggest that Rosglavvtormet [Glavnoye Upravleniye Vtorichnykh Metallov--Main Administration of Secondary Metals] adopt measures to eliminate instances of the copper smelting plant shipping out secondary raw materials suitable for the manufacture of rolled products, and to ask the Sverdlovskiy Sovnarkhoz to organize the production of blister bronze in 1961 at the Kirovogradskiy combine by using a technological process presently used at the Moscow copper electric casting plant.

#### In the Processing of the By-Products Yielded by the Lead Base Alloys.

To consider it necessary to introduce shaft electric furnaces for the re-processing of by-products and scrap yielded by lead base alloys at all the plants working on secondary non-ferrous metals. To recommend that the "Ukrtsink" plant utilize analogous furnaces for the re-processing of all lead raw materials arriving at the plant.

To note that the Podol'skiy non-ferrous metallurgical plant continues to use the accumulated soft lead scrap in an irrational manner by using it as a component of the charge in the production of babbit of the BK brand. This is not in accordance with techniques recommended by the "Giprotsvetmetobrabotka" Institute, which stipulated the utilization of all the accumulated scrap exclusively for the production of alloy of the SSuA brand.

To make a recommendation to the Podol'skiy non-ferrous metallurgical plant to use antimony-lead alloy obtained from processing the accumulated scrap and antimony-lead by-products at the shaft electric furnace, for the production of alloys of the SSuA brand for the storage battery industry; in doing that to take into consideration the experience acquired by the "Ukrtsink" plant in the refining of the given alloy by extracting the tin in mettalic form.

To recommend that all the plants convert their metallurgical aggregates which process lead alloys to a system of electrical heating, by using the positive experience acquired by the Verkhneyvinskiy and the Podol'skiy secondary non-ferrous metallurgical plants.

#### In Scientific Research Work.

To request that the Supreme Council of the National Economy appoint the "Giprotsvetmetobrabotka" Institute as the head institute, which would coordinate all scientific research and experimental-designing work in the field of processing and utilization of secondary non-ferrous metals.

In connection with that, to request the All-Union Sovnarkhoz to expand the secondary non-ferrous metallurgical laboratories of the "Giprotsvetmetobrabotka" Institute, to provide it with an adequate number of research and design personnel, and to supply it with modern equipment and tools; to make certain that it has a work area and to accelerate the transfer of the Moscow bronze-copper plant under its jurisdiction for the organization of an experimental basis.

To consider it imperative for the "Giprotsvetmetobrabotka" Institute to concentrate its attention on the solution of the following scientific problems of utmost importance in the field of secondary non-ferrous metals:

- a) To conduct a study of the scrap iron supply system and the extent of the country's metal fund, the time periods and volumes of scrap supplies, and problems pertaining to the prospective development and economy of the secondary non-ferrous metallurgy;
- b) To develop new alloys and new progressive technological processes for preparing them;
- c) To establish complex processing of the low grade scrap and copper base by-products with the extraction of any valuable ingredients they may contain;
- d) To search for rational means of processing magnesium and zinc scrap and the by-products yielded by their alloys;
- e) To develop new types of equipment and installations which



would assure a complex, effective processing of the secondary non-ferrous metals.

To point out to the "Rosglavvtormet" administration the necessity of accelerating the organization of research work at the laboratory of secondary non-ferrous metals of the Lipetskiy "NIIvtormet" [Nauchno-Issledovatel'skiy Institut Vtorichnykh Metallov--Scientific Research Institute on Secondary Non-Ferrous Metals] and to consider it feasible to create a research-design secondary non-ferrous metals institute prior to 1965 at the Mtsenskiy plant which is now under construction.

To recommend to all secondary non-ferrous metallurgical plants to organize research groups and experimental sections during 1961-1962 for conducting research and experimental work for the improvement of technological processes, for the complex extraction of valuable components and for achieving an improvement in the quality of secondary metals and alloys that are produced.

Improving the Quality of Secondary Non-Ferrous Metal Raw Material and Improving the Organization of its Collection and Storage.

To suggest that all "Vtormet" organizations conduct work for the further perfection of methods of sorting and grading non-ferrous metal scrap at the preliminary processing shops, to ask the Gosplan USSR to supply the charge shops at secondary non-ferrous metallurgical plants of the "Vtormet" organizations and the final scrap processing plants with the necessary equipment: centrifuges, hammer crushers, mechanical shears, briquette and fagotting presses, hoisting-transportation equipment and other equipment.

Secondary non-ferrous metallurgical plants and final scrap processing plants must eliminate the deficiencies that exist in their systems storing and collecting scrap and by-products and to do away with instances of pollution and mixing of scrap.

To request the All-Union Sovnarkhoz and the Ukrainian Sovnarkhoz to examine the question pertaining to an organization of inspection points at the Rosglavvtormet and Ukrglavvtormet and at some of their large administrative offices in order to control the quality of the non-ferrous metal by-products that are released.

To appeal to the personnel at enterprises of the machinebuilding industry to eliminate deficiencies in the organization of non-ferrous metals by-product collection.

To intensify the work of the production-purveyance offices of the "Vtormet" administration in the gathering and storage of scrap non-ferrous metal by-products at the enterprises, and to assure a rise in the skill levels of those in charge through technical training; to utilize visual forms of agitation in order to improve the gathering and storage of the by-products.

The "Giprotsvetmetobrabotka" Institute to develop the specifications for new state standards for scrap and non-ferrous metal by-products with a consideration of the necessary additional differentiation of the by-products according to alloys along with a possible



separation of scrap into separate groups.

The conference expresses the assurance that workers of the secondary non-ferrous metal industry will concentrate all of their efforts and knowledge in order to assure the further development of their field and, on the basis of socialist competition, will fulfill the state plan for the third year of the Seven Year Plan ahead of schedule.